THE PLANT DISEASE REPORTER

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The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. The reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

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IN THIS ISSUE

Check list revision, by Freeman Weiss, page - 274.

Keeping quality of stored ear corn in Nebraska has been more dependent on moisture content at time of cribbing than on the type of crib used for storing, according to C. M. Slagg, J. E. Livingston, and J. C. Swinbank, page - 282.

Incidence of cereal rusts, and other diseases, this spring is reported in several articles and shorter notes: H. R. Rosen, page - 286, discusses incidence of crown rust on oats in Arkansas from October to March; cereal diseases observed in Arkansas in March are reported by Howard W. Larsh, page - 287; and in shorter notes, page - 289, I. M. Atkins reports overwintering of cereal rusts in Texas, George E. Altstatt, C. M. Slagg, and J. S. Tidd report diseases observed on wheat and other small grains in Texas, Kansas, and Indiana, respectively, C. M. Slagg reports molding of harvested grain sorghum in Kansas, and George E. Altstatt reports diseases of flax in Texas.

Diseases reported on various legumes, page - 292.

Reports on storage diseases of sweetpotato, page - 293.

Dithiocarbamates may be useful as soil treatments for the control of soil-borne diseases according to data from preliminary experiments reported by J. W. Heuberger, page - 295.

Apple scab development is reported from New York and Wisconsin, page - 297.

Other reports on diseases of fruit crops, page - 298.

Brief notes on plant diseases, page - 299, include reports on vegetable diseases in Southern California, tobacco diseases in Louisiana, and diseases of ornamental and miscellaneous plants.

CHECK LIST REVISION

Freeman Weiss

LAGURUS (GRAMINEAE)

LAGURUS OVATUS L., HARE'S-TAIL. Annual, of Mediterranean region, sometimes cultivated for ornament and escaped in a few localities in Calif. and N. Car.

Puccinia coronata Cda. (II, III), crown rust.
P. graminis Pers. (II, III), stem rust. Natural infection with both these rusts recorded in P.D.R. Suppl. 130.

LAMARCKIA (GRAMINEAE)

LAMARCKIA AUREA (L.) Moench, GOLDENTOP. Annual, of Mediterranean region, cultivated for ornament, locally established in waste ground Calif. to Texas.

Puccinia coronata Cda. (II, III), crown rust. Calif. Experimentally shown susceptible to 5 specialized races.
P. graminis Pers. (II, III), stem rust. Calif. Experimentally shown susceptible to the vars. avenae Eriks. & Henn. and phleipratensis (Eriks. & Henn.) Stakman & Piemeisel; also to P. montanensis Ell., P. poarum Niels., and P. rubigo-vera (DC.) Wint. vars. dispersa (Eriks.) Carleton and tritici (Eriks. & Henn.) Carleton.
Mosaic, suspected virus. Iowa.

LASIACIS (GRAMINEAE)

LASIACIS spp. Perennial grasses with branching, woody culms, prostrate or clambering, in tropical America.

Angiopsora lenticularis Mains (II, III), rust. P. R. Especially on L. divaricata (L.) Hitch. O and I unknown.
Cephaleuros virescens G. Kunze, green scurf. P. R.
Dimeriella fumagina (Dearn. & Barth.) F. L. Stevens, black mildew. P. R.
Meliola panici Earle, black mildew. Canal Zone, P. R.
Phyllachora graminis (Pers. ex Fr.) Fckl. (? P. lasiacis Syd.), tar spot. Mo.
P. lasiacis Syd., tar spot. P. R. On L. divaricata and L. sorghoidea (Desv.) Hitch. & Chase.
Physalospora bambusae (Rabh.) Sacc., on stems. P. R.
Uromyces costaricensis Syd. (II, III), rust. P. R. On L. divaricata, L. sorghoidea (Desv.) Hitch. & Chase. O and I unknown.

LEERSIA (GRAMINEAE)

LEERSIA ORYZOIDES (L.) Swartz, RICE CUTGRASS (1). Tall perennial occurring in ponds and marshes and along river banks throughout the Eastern and Central U. S. to the Gulf States, also in the Pacific Coast and Southwestern States; important food plant of wildlife. Of similar habit and utility: L. LENTICULARIS Michx., CATCHFLY GRASS (2), ranging from the Great Lakes to La. and Fla.; L. HEXANDRA Swartz, CLUBHEAD CUTGRASS (3), occurring in the Gulf States and tropical America; and L. VIRGINICA Willd., WHITEGRASS (4), occurring in moist woods and meadows in the Eastern and Central States to the Gulf Coast.

Cladotrichum leersiae Atk., leaf blotch. Wis. (1), Ala. (4).
Dactylaria graminum (Schw.) Sacc. (? Piricularia sp.), leaf spot. N. H. (1).
Epichloë typhina (Pers. ex Fr.) Tul., cat-tail, choke. N. Y. (1).
Helminthosporium giganteum Heald & Wolf, leaf spot. Md. (4).
H. leersiae Atk. (published as H. leersii), leaf spot. Ala., Conn., Md. (4).
Metasphaeria leersiae (Pass.) Sacc. (Sphaerella leersiae Pass.), on leaves. N. Y. (1).
Mycosphaerella sp. (as Sphaerella zizaniae (Schw.) Ell. & Ev.), on leaves. Wis. (1).
Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. Wis. (1).
Piricularia grisea (Cke.) Sacc., leaf spot. Wis. (1,4).
Puccinia rubigo-vera (DC.) Wint. (II, III), leaf rust. Wis. (4).
Ramularia sp., leaf spot. La. (3).
Scolecotrichum graminis Fckl., brown stripe. N. Y. (1).
Tilletia corona Scribn., bunt. Md., Mo., Va., Wis. (1); Miss., Tex., Wis. (2); Ill., Ind., Iowa, Md., Miss., Ohio, Wis. (4).
Tolyposporium globuligerum (Berk. & Br.) Ricker, Ala., Tex. (3).
Uromyces halstedii DeToni (II, III), rust. Del., Ill., Ind., Md., Mich., Ohio, Pa., S. Dak., Tex. (1); Ala., Iowa, La., Md., Wis. (4). O and I on Trillium spp.

LEPTOCHLOA (GRAMINEAE)

LEPTOCHLOA DUBIA (H.B. K.) Nees, GREEN SPRANGLETOP. (1) Perennial of the southwestern plains and foothills, furnishes forage and is sometimes cut for hay. L. VIRGATA (L.) Beauv., TROPICAL S. (2) is similar and occurs in the Gulf States; L. FILIFORMIS (Lam.) Beauv., RED S. (3), annual, occurs in waste ground and is a weed in cultivated fields in the Southern States from Va. to Fla., Tex., Kans. and Calif. southward.

Phyllachora leptochloae Chardon, tar spot. Canal Zone (2).
Physalospora tucumanensis Speg., on leaves. La. (3). Ascigerous stage of Colletotrichum falcatum Went.
Puccinia bartholomaei Diet. (II, III), rust. Tex. (1). O and I on Asclepias spp.

LEPTOCHLOA DUBIA cont.

P. leptochloae Arth. & Fromme (II, III), rust. Tex., P. R. (3). O and I unknown.

Ustilago heterogena P. Henn., stem smut. Ariz., N. Mex. (3); also on L. scabra Nees in La.

U. ornata Tracy & Earle, seed smut. Miss. (3).

LEPTOLOMA (GRAMINEAE)

LEPTOLOMA COGNATUM (Schult.) Chase, FALL WITCHGRASS. Perennial of sandy fields ranging from New England to the Mississippi Valley and Gulf of Mexico; of some forage value, also a weed in cultivated ground.

Phyllachora punctum (Schw.) Orton, tar spot. Tex., Wis.

Puccinia atra Diet. & Holw. (II, III), rust. Tex. O and I unknown.

P. imposita Arth. (II, III), rust. Ala., Kans., N. Mex., Okla., Tex. O and I unknown.

LOLIUM (GRAMINEAE)

LOLIUM MULTIFLORUM Lam., ITALIAN RYEGRASS (1). Short-lived perennial of Europe, cultivated for forage and for turf in parks and lawns, especially in the South and the Pacific Coast where it is grown as a winter annual. Closely related to the following but differing in agricultural adaptation. L. PERENNE L., ENGLISH R. (2). A hardier and longer-lived perennial, cultivated in meadows and lawns, becoming naturalized in waste ground, somewhat more northerly in range.

Ascochyta graminicola Sacc. var. brachypodii Trail, white leaf spot. Oreg. (2).

A. lolii (Zimm.) Sprague & A. G. Johns., brown leaf spot. Calif., Oreg. (1,2); Ky. (1).

Cladosporium sp., leaf mold. Oreg. (1,2).

Claviceps purpurea (Fr.) Tul., ergot. Calif., Okla., Oreg., Wash. (1,2); Ky. (1); Idaho, Kans., Md., Mich., Minn., Nebr., S. Dak., Va., W. Va. (2).

Colletotrichum graminicolum (Ces.) G. W. Wils., anthracnose. Oreg. (1,2), Wash. (1), Pa. (2).

(Diplodina lolii Zimm.): Ascochyta lolii.

Fusarium culmorum (W. G. Sm.) Sacc., also var. leteius Sherb., root rot, Oreg.

Fusoma sp. (? F. triseptatum Sacc. = Septogloeum oxysporum Bomm. Rouss. & Sacc.), leaf spot. Oreg. (1).

Gibberella sp. (? G. zeae (Schw.) Petch), root rot. Pa. (2).

Helminthosporium sativum Pam. King & Bakke, root rot. Oreg. (1,2); Minn. (2).

H. siccans Drechs., leaf blight. Md., Va. (1, 2); Ky. (1); Ohio, Oreg. (2).

LOLIUM MULTIFLORUM cont.

Heterosporium sp., secondary leaf spot. Oreg. (1, 2).
Leptosphaeria sp. (? L. lolii Syd.), associated with Ascochyta lolii. Oreg. (1,2); Pa., Tex. (2).
Ovularia lolii Volkart, leaf spot, eyespot. Oreg. (2).
Phytophthora sp., leaf rot. Oreg. (2).
Pseudomonas coronafaciens (Elliott) Stapp var. atropurpurea (Reddy & Godkin) Stapp, chocolate spot. Oreg. (1,2).
Puccinia coronata Cda. (II, III), crown rust. Calif., Fla., Ky., La., Okla., Oreg., Tex., Wash. (1); Ala., Ariz., Calif., Ky., Oreg., Pa., S. Car., Utah, Wash. (2).
P. glumarum (Schm.) Eriks. & Henn. (II, III), stripe rust. Oreg., Wash. (2).
P. graminis Pers. (II, III), stem rust. N. Y. (1,2); Oreg. (1); Mich., Minn. (2). The var. phlei-pratensis (Eriks. & Henn.) Stakman & Piemeisel identified in N. Y.
P. montanensis Ell. (II, III), brown stripe rust. Mich.
Rhizoctonia solani Kuehn (sometimes as Rhizoctonia sp.), root rot, brown patch. Cosmopolitan but infrequent (1, 2).
Rhynchosporium orthosporum Caldwell, scald. Oreg. (1,2).
R. secalis (Oud.) J. J. Davis, scald. Oreg. (1,2).
Scolecotrichum graminis Fckl., brown stripe. Oreg. (1,2). Both host spp. are resistant.
Septoria loligena Sprague, leaf spot. Calif.
S. tritici Rob. ex Desm. var. loliicola Sprague & A. G. Johns., leaf blotch. Oreg. (1,2).
Titaea sp., leaf mold. Oreg. (1,2).
Ustilago sp., (? U. lolii Magn.), head smut. Oreg. (1). U. lolii has been found on L. temulentum L. in Ala.
? U. striaeformis (West.) Niessl, stripe smut. Oreg. (2).

LYCURUS (GRAMINEAE)

LYCURUS PHLEOIDES H.B.K., WOLFTAIL. Perennial of plains and foothills in Colo. to Tex. and Ariz., and southward; an important forage grass.

Ustilago lycuroides Griff., seed smut. Ariz.

MANISURIS (GRAMINEAE)

MANISURIS spp. Perennials of moist habitats in pine woods and open ground chiefly of the Gulf Coastal Plain and southward, occasionally to N. J. and Mo.; of limited forage value.

Phyllachora quadraspora Tehon, tar spot. Miss.
Puccinia levis (Sacc. & Bizz.) Magn. (II, III), rust. P. R. O and I unknown.
Stagonospora maritima Syd., leaf spot. Tex.

MELICA (GRAMINEAE)

MELICA BULBOSA Geyer, ONIONGRASS (1). Tall perennial of plains, open woodlands and mountain meadows of the far West, from Wash. and Idaho to Colo., Tex. and Calif.; furnishes good but not abundant forage. M. CALIFORNICA Scribn. (2) and M. SPECTABILIS Scribn. Scribn. (3) are of similar utility but the former is restricted to Calif. and Oreg.

Cercosporella subulata Sprague, leaf blast. Wyo. (1).
Dilophospora alopecuri Fr., twist. Wyo. (1).
Erysiphe graminis DC., powdery mildew. Calif. (2).
Puccinia graminis Pers. (II, III), stem rust. Calif. (1,2).
Scolecotrichum graminis Fckl., brown stripe. Oreg. (1), Wyo. (3).
Ustilago hypodytes (Schlecht.) Fr., stem smut. Calif. (1).

MELICA IMPERFECTA Trin., CALIFORNIA MELIC (1); M. PORTERI Scribn., PORTER M. (2). Perennials of open hilly woodlands in the western mountains and foothills, (1) chiefly in California, (2) in Mo. and Nebr. to Tex.; furnishing good forage where sufficiently abundant. M. MUTICA Walt., TWO-FLOWERED M. (3), occurs in similar habitats in the Central and Eastern States.

Puccinia coronata Cda. (P. melicae Syd.) (II, III), crown rust. Miss. (3).
P. montanensis Ell. (II, III), brown stripe rust. Calif. (1). O and I on Berberis fendleri Gray.
P. schedonnardi Kell. & Swing. (II, III), rust. Colo. (2), Ind. (3). O and I on Malvaceae.
Urocystis agropyri (Preuss) Schlecht., flag smut. Ariz., Calif. (1).

Bends (hairpin) - cause unknown. Wash. On M. torreyana Scrib.

MELICA spp., including M. ARISTATA Thurb. (1), M. GEYERI Munro (2), M. HARFORDII Boland (3), M. SMITHII (Porter) Vasey (4), and M. SUBULATA (Griseb.) Scribn. (5). Perennials occurring chiefly in woods and open ground in the Northwestern States and Calif.; of limited forage value.

Cercosporella subulata Sprague, leaf blast. Wyo. (3); Oreg. (5).
Puccinia graminis Pers. (II, III), stem rust. Calif. (1).
P. paradoxica Ricker (II, III), rust. Mich. (4). O and I unknown.
P. pygmaea Eriks. (II, III), rust. Calif. (5). O and I on Berberis in Europe.
P. rubigo-vera (DC.) Wint. (II, III), leaf rust. Calif. (2).
Scolecotrichum graminis Fckl., brown stripe. Wyo. (2).
Ustilago hypodytes (Schlecht.) Fr., stem smut. Wash. (3).

MILIUM (GRAMINEAE)

MILIUM EFFUSUM L., AMERICAN MILLETGRASS. Tall succulent perennial of moist woodlands in the Northeastern and Great Lakes States; of minor forage value.

Colletotrichum graminicolum (Ces.) G. W. Wils., anthracnose. Mich.
Erysiphe graminis DC., powdery mildew. Mich.
Puccinia graminis Pers. (II, III), stem rust. Mich., Wis. The var. avenae Eriks. & Henn. identified.
P. pygmaea Eriks. (II, III), leaf rust. Wis.
Scolecotrichum graminis Fckl., brown stripe. N. Y.

MOLINIA (GRAMINEAE)

MOLINIA CAERULEA (L.) Moench, MOORGRASS. Perennial introduced from Europe, sparingly established in meadows in the Northeastern States; of minor forage value.

Puccinia graminis Pers. (II, III), stem rust. Natural infection recorded, PDR Suppl. 130.

MONANTHOCHLOË (GRAMINEAE)

MONANTHOCHLOË LITTORALIS Engelm., SHOREGRASS. Creeping perennial of tidal flats in Fla., Tex. and Calif.; furnishes food for wildlife.

Puccinia schedonnardi Kell. & Swing (II, III), leaf rust. Tex. O and I on Malvaceae.

MUHLENBERGIA (GRAMINEAE)

MUHLENBERGIA ASPERIFOLIA (Nees & Mey.) Parodi, SCRATCHGRASS (1); Low perennial of the Western States from the Mississippi Valley to the Pacific Coast, usually in moist, alkaline habitats; furnishes food for wildlife.

Entyloma crastophilum Sacc., leaf smut. Utah.
Phyllachora vulgata Theiss. & Syd., tar spot. Colo., Nebr., N. Mex., N. Dak., Oreg., Wash.
Puccinia schedonnardi Kell. & Swing. (II, III), leaf rust. N. Dak. to Tex., Calif. & Wash. O and I on Malvaceae.
Septogloeum oxysporum Sacc. Bomm. & Rous., char spot. N. Dak.
Septoria sp. (S. mississippiensis Sprague), leaf spot. N. Dak.
Tilletia asperifolia Ell. & Ev., seed smut. Mont. to N. Mex., Calif., Oreg. and Wash.

MUHLENBERGIA cont.

MUHLENBERGIA CUSPIDATA (Torr.) Rydb., PLAINS MUHLY (1). Slender tufted perennial of the prairies and plains from Ohio to N. Mex. and Mont. Also M. SQUARROSA (Trin.) Rydb., MAT M. (2), and M. UTILIS (Torr.) Hitchc., APAREJO GRASS (3); creeping perennials of the Western Plains, usually in alkaline soil, useful for grazing or furnishing food for wild life.

Leptosphaeria sporoboli Ell. & Gall., on culms. Mont. (2).
Phyllachora vulgata Theiss. & Syd., tar spot. Ind., Iowa, Minn., Nebr., N. Mex., N. & S. Dak. (1); N. Mex., N. Dak. (2).
Puccinia graminis Pers. (II, III), stem rust. Iowa, Nebr. (1).
P. schedonnardi Kell. & Swing. (II, III), leaf rust. Iowa, Nebr., N. & S. Dak. (1); Ariz., Mont., N. Mex., N. Dak., Utah (2); Ariz., N. Mex. (3).
Selenophoma sp., speckle. N. Dak. (1).
Ustilago pseudohieronymi Zundel, leaf smut. Colo. (2).

MUHLENBERGIA FILIFORMIS (Thurb.) Rydb., PULL-UP MUHLY (1). Annual bunchgrass occurring throughout the western plains; of some food value to wildlife. Also M. TEXANA Buckl., TEXAS M. (2), similar, but limited to Tex. and N. Mex.

Puccinia schedonnardi Kell. & Swing. (II, III), leaf rust. N. Mex. (1).
Tilletia montana Ell. & Ev., seed smut. Mont. (1).

MUHLENBERGIA MONTANA (Nutt.) Hitchc., MOUNTAIN MUHLY (1); M. PAUCIFLORA Buckl., NEW MEXICAN M. (2); M. PORTERI Scribn., BUSH M. (3); M. TORREYI (Kunth.) Hitchc., RINGGRASS (4). Perennial bunchgrasses of the western plains and foothills; (1) occurring throughout the Rocky Mountain States, the others in the Southwest; all valuable for forage.

Curvularia geniculata (Tracy & Earle) Boed., secondary root rot. N. Dak. (1).
Fusarium equiseti (Cda.) Sacc. and F. oxysporum Schlecht., secondary root rot. N. Dak. (1).
Helminthosporium sativum Pam. King & Bakke, root rot. N. Dak. (1).
Phyllachora coloradensis Orton, tar spot. Colo. (1).
P. vulgata Theiss. & Syd., tar spot. Colo., Ariz. (1); N. Mex. (1,2).
Puccinia schedonnardi Kell. & Swing. (II, III), leaf rust. Colo., N. Mex., Utah (1); Ariz. (3); Colo. (4).
Ustilago bethelii Zundel, leaf smut. Colo. (1).
U. pseudohieronymi Zundel, leaf smut. Colo. (4).
U. muhlenbergiae P. Henn., inflorescence smut. N. Mex. (2,3); Ariz. (3).

MUHLENBERGIA RACEMOSA (Michx.) B.S.P., MARSH MUHLY (1); tall perennial of moist meadows throughout the northern U.S. Also M. MEXICANA (L.) Trin., WIRESTEM M. (2), M. SCHREBERI Gmel., NIMBLEWILL (3), and M. SYLVATICA Torr., FOREST M. (4). Perennials of damp, often shady, habitats ranging from the Mississippi Valley to the Atlantic Coast.

MUHLENBERGIA RACEMOSA cont.

Cercospora muhlenbergiae Atk., leaf spot. N. Dak. (1); Wis. (1,4); Ala. (2,3).
Fusarium graminum Cda., on seeds. Mich.
F. scirpi C. R, Lamb. & Fautr. var. acuminatum (Ell. & Ev.) Wr., secondary root rot. N. Dak.
Helminthosporium giganteum Heald & Wolf, leaf spot. Md. (2,3).
Leptosphaeria muhlenbergiae Rehm, on culms. N. Dak.
Macrophomina phaseoli Maubl., leaf blight. Ind. (2), Va. (3).
Phaeoseptoria festucae Sprague, leaf spot. Mich.
Phyllachora vulgata Theiss. & Syd., tar spot. Me. to Ga., La., and N. Dak. (1, 2, 3, 4).
Puccinia graminis Pers. (II, III), stem rust. Iowa, Mo. (2). Natural infection recorded on (1), PDR Suppl. 130.
P. schedonnardi Kell. & Swing. (II, III), leaf rust. Va. to Mo., Utah and N. Dak. (1); Conn. to Ky., Okla., and N. Dak. (2, 3); Ind., N. Y., Va., Wis. (4).
Pythium arrhenomanes Drechs., root browning. Minn. (1).
Rhizoctonia solani Kuehn, secondary root rot. Minn. (1).
Scolecotrichum graminis Fckl., brown stripe. Wis. (1), Iowa (2).
Septoria mississippiensis Sprague, leaf spot. Minn. (2).
Sphacelotheca montaniensis (Ell. & Holw.) Clint., inflorescence smut. Mont., N. Dak. (1).
Uromyces minimus J. J. Davis (II, III), rust. Oreg., Wash. (1), Wis. (4). O and I unknown.

Bends (hairpin) - cause unknown. Wash. (1).

OLYRA (GRAMINEAE)

OLYRA LATIFOLIA L., CARRICILLO. Bamboo-like woody perennial of tropical America.

Angiopsora phakopsoroides (Arth. & Mains) Mains (II, III), rust. P. R.
Dimeriella fumagina (Dearn. & Barth.) F. L. Stevens, black mildew. Canal Zone, P. R.
Meliola panici Earle, black mildew. Canal Zone, P. R.
Puccinia deformata Berk. & Curt. (II, III), rust. P. R.

OPLISMENUS (GRAMINEAE)

OPLISMENUS HIRTELLUS (L.) Beauv. (Panicum variegatum of florists), BASKET GRASS (1); O. SETARIUS (Lam.) Roem. & Schult. (2). Prostrate perennials of tropical America, the former cult. for ornament, the latter occurring along the Atlantic and Gulf Coasts to N. Car. and Tex. and furnishing food for wildlife.

OPLISMENUS HIRTELLUS cont.

Meliola panici Earle, black mildew. P. R. (1).

Phyllachora punctum (Schw.) Orton, tar spot. Fla., La., S. Car., P. R. (1, 2).

Puccinia inclita Arth. (II, III), rust. P. R. (1).

Uredo paspalicola P. Henn. II (? Angiopsora compressa Mains), rust. P. R. (1).

DIVISION OF MYCOLOGY AND DISEASE SURVEY.

MOISTURE CONTENT AND DEVELOPMENT OF MOLDS IN CORN STORED UNDER VARIOUS CONDITIONS IN THREE EASTERN NEBRASKA COUNTIES DURING THE WINTER OF 1944-45

C. M. Slagg, J. E. Livingston, and J. C. Swinbank

Nebraska produced a record crop of 329,855,000 bushels of corn in 1944. For a large proportion of this yield, permanent cribs were not available, and much corn was stored in temporary cribs and in piles on the ground. Corn in temporary storage is usually shelled and marketed early in the winter, but the size of the crop and shortage of railway cars made this impossible during the past winter. An unusually damp winter further complicated the problem, and reports of moldy corn and considerable losses in storage prompted the organization of a "Save the corn" campaign, under the auspices of the Nebraska Agricultural Experiment Station and the Agricultural Extension Service, and headed by J. C. Swinbank, Secretary of the Nebraska Grain Improvement Association. On February 20, 1945 it was estimated that 73,671,660 bushels of corn were still on the ground, and the campaign concentrated its efforts on moving this corn into permanent or temporary cribs of an approved type.

A preliminary survey by the senior author, in the east-central district in mid-February indicated that spoilage was occurring in some permanent cribs as well as in temporary cribs and piles in the open; however, many piles on the ground without protection of any kind were seen in which the corn was in good condition. The situation seemed to warrant a more careful survey, which was carried out during the period from March 7 to 14, 1945. This survey was made in York, Burt, and Thurston Counties to determine the percentage of moisture in corn in cribs of different types and to determine whether the percentage of moldy kernels could be correlated with the percentage of moisture in the corn. Four or more samples were taken with a probe at depths of from 2 1/2 to 3 feet, and from 5 to 6 feet, from the outside of each crib. All probes were made 4 feet above the floor of the crib. The 4 or more samples from each depth were combined so that each lot tested for moisture and mold was a composite sample from 4 or more places at the designated depth. All samples were placed in moisture-proof cloth bags and stored at 40° F until moisture and mold determinations were made in the laboratories of the Department of Plant Pathology, College of Agriculture, University of Nebraska.

The results presented in Table 1 show that the condition of the corn when it was cribbed was one of the most important factors. Corn that was damp or not fully ripened at the time of cribbing was still wet in the center of the crib in mid-March of 1945 regardless of the type of crib,

Table 1. Average percentage of moisture and moldy kernels in Nebraska corn stored in different types of cribs. Samples taken from March 7-14, 1945, in York, Burt, and Thurston Counties.

Type of crib	Condition of corn when cribbed (farmer's statement)	Percent of all cribs (total of 73)	Average percent moisture Mar. 7-14	Average percent moldy kernels Mar. 17
		%	%	%
Permanent frame	Dry	43.3	20.3	3.7
	Wet	12.1	27.9	24.7
Temporary with vertical ventilator	Dry	8.1	21.5	3.4
	Wet	1.3	28.2	22.1
Temporary with no ventilator	Dry	17.6	20.2	3.7
	Wet	6.8	29.4	19.7
Pile on ground	Dry	5.4	21.0	9.4
	Wet	5.4	28.9	34.1

74.3% of the corn listed by the farmer as dry when cribbed and 25.7% listed as tough or wet.

Average percentage of moldy kernels in all cribs 9.49 (73 cribs).

Field surveys in 87 fields in 26 eastern Nebraska counties showed 6.5% moldy kernels before harvest.

Table 2. Percentage of total cribs having corn at different moisture contents and relation of moisture content to the percentage of moldy kernels, York, Burt, and Thurston Counties, Nebraska

Moisture content of corn 5 to 6 ft. from outside of crib	Percent of cribs	Percent of moldy kernels
%	%	%
16-17.9	4.1	1.5
18-20.9	46.6	3.5
21-23.9	23.3	7.1
24-26.9	8.2	9.4
27-29.9	11.0	16.3
30-39.6	6.9	51.2

Average percent moldy kernels in all cribs - 9.49% (73 cribs)
Field surveys in 87 fields in 26 eastern Nebraska counties showed 6.5% moldy kernels before harvest.

Table 3. Average difference in percentage of moisture in corn at distances of 2 1/2 to 3 feet and 5 to 6 feet from outside the crib at a height of 4 feet from the floor. (York, Burt, and Thurston Counties. 73 cribs)

Type of crib	Condition of corn when cribbed (farmer's statement)	Percent of all cribs	Average percent moisture in crib		Difference
			2 1/2'-3'	5'-6'	
		%	%	%	
Permanent frame	Dry	42.5	19.2	20.3	1.1
	Wet	11.0	24.1	27.9	3.8
Temporary with vertical ventilator	Dry	8.2	20.3	21.5	1.2
	Wet	1.4	20.8	28.2	7.4
Temporary without ventilator	Dry	19.2	19.6	20.2	0.6
	Wet	6.9	23.5	29.4	5.9
Pile on ground	Dry	5.5	21.8	21.2	- 0.6
	Wet	5.5	25.7	28.9	3.2

Table 4. Average difference in percentage of moisture in corn at distances of 2 1/2 to 3 feet and 5 to 6 feet from outside the crib at a height of 4 feet from the floor. (Hamilton, Clay, and Fillmore Counties. 60 cribs).

Type of crib	Condition of corn when cribbed (farmer's statement)	Percent of all cribs	Average percent moisture in crib		Difference
			2 1/2'-3'	5'-6'	
		%	%	%	
Permanent frame	Dry	55.7	18.7	19.4	0.7
	Wet	8.2	22.2	25.3	3.1
Temporary with vertical ventilator	Dry	4.9	19.2	19.6	0.4
	Wet	1.6	19.7	24.8	5.1
Temporary without ventilator	Dry	18.0	19.0	20.5	1.5
	Wet	0.0	0.0	0.0	0.0
Pile on ground	Dry	8.2	19.9	20.4	0.5
	Wet	3.3	18.8	24.1	5.3

and corn that was dry at cribbing still had a low moisture content.

The development of mold, as might be expected, was highest in the corn that carried a high moisture content at the time of cribbing and lowest in cribs in which the corn was driest at time of cribbing. Again the type of crib was of less importance up to the date of the survey.

The development of molds in the crib was closely related to the amount of moisture in the cribs, as shown in Table 2. There was a progressive increase in the amount of mold with the increase in moisture content. Above 28% moisture there was a great increase in the percentage of mold, and in corn with a moisture content above 30% the percentage of mold was sufficiently high that in most cases it was questionable whether the corn would be of any value.

The data presented in Table 3 indicate that by the middle of March only a limited amount of drying had taken place and the drying that did occur was in the cribs with the largest amount of surface exposed. The tall, round, temporary wire and slat cribs, either with or without ventilators, had good air movement around them, whereas the permanent frame cribs often had corn piled in the driveway, or had other obstructions which might interfere with circulation of air. These statements are supported by the data in Table 3 showing that the small amount of drying that took place in the corn stored wet occurred in the outer portion of the cribs.

The average percentage of moldy kernels in all cribs was 9.49. Not all of this developed in the crib, as surveys made in the fall showed approximately 6.5% mold damage. However, many of the moldy ears occurring in the field would be discarded during harvesting operations so that somewhat less than 6.5% of moldy kernels would get into the crib.

Mold readings were not obtained in Hamilton, Clay, and Fillmore Counties, thus the results on the moisture content of the corn in different type cribs are presented separately in Table 4. The data are similar to those for York, Burt, and Thurston Counties, Table 3, except that the moisture content of the corn was lower in nearly every comparative storage situation.

Conclusions: The winter of 1944-45 was not conducive to drying of ear corn in cribs in Nebraska. Therefore, the type of crib, up to the time of the survey, had less effect on the keeping quality of stored ear corn than the condition of the corn at the time of cribbing. Corn with less than 21% moisture at the time of cribbing was keeping satisfactorily, whereas, corn with 27% moisture or more was in serious danger from spoilage due to molds. Some drying was taking place in the outer portions of cribs in corn stored with a moisture content above 27%. The drier samples from such cribs contained around 24% moisture.

Equilibrium with the atmosphere was apparently being attained at between 18 and 21% moisture as 46.6% of the cribs were in this group.

EMERGENCY PLANT DISEASE PREVENTION PROJECT, NEBRASKA AGRICULTURAL EXPERIMENT STATION AND AGRICULTURAL EXTENSION SERVICE, AND NEBRASKA GRAIN IMPROVEMENT ASSOCIATION

INCIDENCE OF CROWN RUST OF OATS FROM OCTOBER TO MARCH, 1944-45, IN ARKANSAS

H. R. Rosen

In the fall of 1944 Arkansas experienced one of the most severe epidemics of crown rust [Puccinia coronata] on susceptible varieties that has been observed in fall seasons in over 25 years. The closest approach to this epidemic occurred in the fall of 1940 but that epidemic was not nearly so severe as the one of 1944. Early fall-planted oats were most heavily infected.

The following percentages of crown rust were recorded at the Main Experiment Station farm, Fayetteville, on November 10: Fulghum 2500 50%, Forkedeer 50%, Fulwin 40%, and Lee 50%. In contrast with these susceptible varieties, resistant sorts, including Traveler, Letoria, Stanton, De Soto, and Marmac showed only a trace of crown rust. Red Rustproof strains, such as Ferguson 922 and New Nortex, developed even less rust than the resistant Victoria hybrids just mentioned.

In addition to the named susceptible varieties, a number of unnamed Bond hybrids that showed a high degree of crown rust resistance in the past 6 to 8 years were badly rusted. Included among these were selections from crosses between Tennessee 1922 by Bond x Iogold, and Tennex by Bond x Iogold. Other selections from the same crosses were much less rusted. Bond itself was also infected although the percentage of infection was not nearly so high as on some of its hybrids. Seemingly Bond and a few of its hybrids possess a crown-rust-escaping quality which was not correlated with the 4-type pustules it produced in the fall of 1944.

By utilizing Dr. H. C. Murphy's differential varieties, it was determined that race 45 of crown rust was present on Bond.

This race was also identified on collections of crown rust made in May and June, 1944, in the following counties: Washington and Boone in the extreme northern part of the State, Jefferson in the south-central, and Hempstead in the southwestern part. It was without much doubt also present in Lee County in the extreme eastern part of the State since Dr. Howard Larsh and the writer observed crown rust on Bond hybrids at Marianna (Cotton Branch Experiment Station) on May 19, 1944.

The severe fall 1944 epidemic is perhaps a follow-up of an equally severe epidemic on spring oats previously recorded (Phytopath. 35: 143-144, 1945). With fairly abundant late summer rains, volunteer oats were found infected with crown rust in the late summer and early fall of 1944 at the Main Agricultural Experiment Station farm. Since these oats spanned the period between the harvesting of the spring-planted crop and the planting of fall oats, there is probably not much doubt that the fall epidemic represented in part at least a continuation of the races present on the spring oats.

Abundant crown rust pustules were found on early fall-planted oats from October to January, although the number declined in that period as frosts and freezes killed those leaves that were most heavily infected. Beginning around the middle of January, crown rust pustules became more and more difficult to find, so that by early March the writer was unable to find any pustules.

Presumably this does not necessarily mean that the rust was completely killed in this period. There are possibilities that some live infections

still remain either as unobserved pustules with viable spores or as late infections which have not as yet produced pustules.

It has been fairly well established that rust on small grains increases the nitrogen or crude protein content of the plants. This apparently explains the relatively high crude protein content of susceptible varieties in the fall of 1944 and the diminishing percentages thereafter. For example, in terms of oven-dry matter, the variety Lee possessed the following percentages of crude protein (average of 16 clippings per month, except December in which there were only 8 clippings): November 29.1%, December 21.4%, January 21.4%, and February 16.4%. (March clippings are not yet fully determined but the average of the first 4 clippings was 15.3%). These data compare as follows with Ferguson 922, a variety which was practically free from rust (8 clippings per month except December in which there were only 4 clippings): November 21.7%, December 16.6%, January 16.8%, and February 14.1%. While there may have been a significant difference in crude protein content between Lee and Ferguson 922 clipped on the same days in November and December, the variation in protein content of different plots of the same variety suggests that after these months there was little or no significant difference between the two varieties.

In any case, the data obtained up to the present indicate that in any plot where crown rust was abundant, the percentage of crude protein was relatively high and tended to introduce an artificial value to the protein content of that variety. While this may have some possible usefulness in indicating amounts of rust, it was very discouraging from the breeding standpoint, which aimed to determine any inherent differences between varieties or selections.

AGRICULTURAL EXPERIMENT STATION, UNIVERSITY OF ARKANSAS

EARLY SPRING INCIDENCE OF CEREAL DISEASES IN ARKANSAS

Howard W. Larsh

An early survey, March 1 to 17, 1945, was made to ascertain the incidence of diseases on cereal crops. Observations were made on 29 commercial[1] oat plantings, 14 wheat plantings, 7 rye plantings, and 2 barley plantings. Cereal plantings in the following counties were surveyed: Benton, Washington, Crawford, Franklin, Pope, Johnson, Conway, Faulkner, Pulaski, Lonoke, Prairie, and Arkansas. The nursery and trial plantings on the Main Experiment Station at Fayetteville, and on the Rice Branch Experiment Station at Stuttgart were also examined.

OATS. Approximately 1043 acres were surveyed. In no instance was crown rust (Puccinia coronata) observed, although several of the plantings examined had been surveyed last fall and found to be moderately to severely infected at that time.

Helminthosporium Leaf Spot (Helminthosporium sativum) was present in varying amounts in all of the plantings surveyed. In many instances severe spotting and killing of the leaves could be attributed to leaf spot. Many

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1 Commercial plantings = Privately-owned farms.

of the fields were heavily infected and frequently the older leaves had been destroyed by leaf spot.

Bacterial Blight or Halo Blight (Pseudomonas coronafaciens) caused severe spotting and discoloration of the leaves in the Stuttgart area. The earlier characteristic water-soaked ovate to oblong central areas along with the halo-like areas were relatively rare. Most of the infections observed were comparatively old. Infected specimens were brought back for laboratory and greenhouse studies, and verification. Plants were artificially inoculated by atomizing a suspension of macerated infected leaves onto healthy oat plants growing in the greenhouse. These plants showed characteristic symptoms of halo blight in 5 or 6 days. A bacterium, isolated by Dr. W. W. Ray corresponded very closely to the description of Pseudomonas coronafaciens.

BARLEY. Approximately 40 acres were surveyed. The varietal and nursery plantings at Fayetteville and Stuttgart were also observed.

Leaf Rust (Puccinia anomala) occurred in both of the commercial plantings as well as on some of the varieties at both experiment stations. Although infection was very light in the commercial plantings at this date, volunteer barley plants could be found heavily laden with leaf rust pustules. The presence of barley leaf rust at this time differs greatly from the time of its first observation in 1944, when leaf rust on barley was rather difficult to locate even late in the growing season.

Rhynchosporium Scald (Rhynchosporium secalis) was by far the most serious and destructive disease of barley observed at this time in Arkansas. This was especially true in the varietal plantings on the Main Experiment Station, Fayetteville, and at the Rice Branch Experiment Station, Stuttgart. As compared to the 1944 season, scald was observed somewhat earlier; however, the plants are farther along in their development this season as compared to the same date last season. This was especially true at Fayetteville. The newer leaves in the varietal plantings at Fayetteville were fairly free from scald infections at the time of these observations, while all leaves were infected in the plantings at Stuttgart.

Scald was also observed in the two commercial plantings, but much less in severity than in the trial plantings at the experiment stations mentioned above.

Spot Blotch (Helminthosporium sativum) occurred in varying amounts in all of the plantings examined. It was much more serious in the commercial fields than scald. Considerable yellowing and dying of the older leaves resulted from early infections of spot blotch.

RYE. Approximately 160 acres were surveyed. Growing conditions have been favorable for the development of rye during late winter and early spring. Thus, in many of the plantings surveyed the plants were in the boot stage or had begun to head out. These prevailing favorable weather conditions were also ideal for the development of leaf rust and other diseases of rye.

Leaf Rust (Puccinia rubigo-vera var. secalis) was present in all of the rye fields examined. The intensity of the rust varied in each of the 7 fields surveyed; however, in 3 plantings most of the older leaves were infected so heavily that yellowing and slight defoliation was evident. In 2 fields, where a few plants had headed out, the flag leaves were infected. These 2 plantings were so heavily infected that they had a marked yellow cast, due to leaf rust.

Stem Rust (Puccinia graminis) was observed and leaves collected in one planting near Van Buren. Typical oblong reddish-brown sori were observed on several of the plants and microscopical examination by Dr. H. R. Rosen verified the stem rust fungus. These plants were in the rosette stage at the time of these observations.

Rhynchosporium Leaf Blotch (Rhynchosporium secalis) occurred in 2 commercial plantings and in the trial plantings at Stuttgart. In no case, however, did the scald on rye compare with that observed on barley.

WHEAT. Approximately 560 acres were surveyed. Leaf Rust (Puccinia rubigo-vera var. tritici) was observed in varying amounts in all of the 14 fields surveyed. The most severely infected planting noted was in the varietal trials on the Rice Branch Experiment Station, Stuttgart, where according to the modified Cobb scale ("U.S.D.A. scale") an infection of between 65% and 100% was estimated. The infected plants had not reached the jointing stage of development at the time of this survey.

The late winter and early spring weather has been very conducive to the development and dissemination of the leaf rust inoculum. Should these exceptionally favorable conditions prevail for the next few weeks the incidence of leaf rust of wheat should compare very closely with other epiphytotic rust years.

Speckled Leaf Blotch (Septoria tritici). Considering the wheat-growing area as a whole speckled leaf blotch was mild as compared with the same period in 1944. Nevertheless, in several instances considerable yellowing of the plants and dead foliage could be attributed to early infections by this fungus.

EMERGENCY PLANT DISEASE PREVENTION PROJECT.

SHORTER NOTES ON DISEASES AND CONDITION OF CEREAL CROPS

Except where noted, reports are of the Emergency Plant Disease Prevention Project Surveys.

OVERWINTERING OF CEREAL RUSTS AT DENTON, TEXAS, DURING 1944-45: The winter has been extremely mild, the minimum to date being 20°F in December. In spite of the relatively mild winter with abundant moisture, grain has made relatively slow growth and has remained in a well-hardened condition. This probably has been due to the lack of extremes and to the fact that night temperatures reached freezing or sufficiently near freezing temperatures a large part of the time. Both January and February mean temperatures have been well above normal, February being nearly 3 degrees above normal. During the past 10 days, excessive precipitation has caused some damage by floods in this area and has delayed farm work. More than 6 inches of rain has fallen in the past 2 weeks, climaxed by a freezing rain the past 2 days that has caused severe damage in this area to fruit and shade trees, and to all communication lines.

No winterkilling has occurred among even the most tender small grain varieties. Even check varieties of flax such as Rio have survived and are attempting to bloom at this time.

Leaf rust [Puccinia rubigo-vera var. tritici] of wheat and crown rust [P. coronata] of oats have been present all winter, and fresh pustules

could be found almost any time. Stem rust [P. graminis] of wheat and oats was present in the fall but as most grain in this vicinity has been pastured heavily, we have been unable to find any recently. It seems reasonable to expect that all the rusts may have overwintered even this far north. -- I. M. Atkins, Division of Cereal Crops and Diseases. March 1.

DISEASES OF SMALL GRAINS IN TEXAS: Leaf rust of oats was present in fields in Wharton, Victoria, Calhoun, Nueces, Bee, Lavaca, DeWitt, and Brazos Counties. P. coronata was observed on rye grass in Hidalgo and DeWitt Counties.

Stem rust was observed on oats in Nueces, Bee and Hidalgo Counties. In experimental plantings at Weslaco, stem rust was very severe (March 23).

Bacterial stripe (Pseudomonas striafaciens) was found on oats in trace amounts at Chillicothe (February 23) and on Tama oats at Beeville (February 28). Halo blight (P. coronafaciens) was causing slight loss of leaf at Robstown on oats (March 1).

Leaf rust of wheat was present in Wharton, Calhoun, Nueces, Bee, Hidalgo, and Brazos Counties.

Stem rust of wheat was observed in Nueces and Bee Counties.

Traces of leaf rust (Puccinia anomala) were observed in barley at Robstown, Nueces County, and stem rust was present in the planting at Weslaco.

Barley stripe (Helminthosporium gramineum) was present on barley at Beeville, Robstown, and Gregory, and College Station.

Rye rust (Puccinia rubigo-vera var. secalis) was common on rye sown as orchard cover crop near Gorham (February 25). -- George E. Altstatt, report of March surveys.

WHEAT LEAF RUST AND SPECKLED LEAF BLOTCH IN KANSAS: During the week of March 19 to 24, winter wheat in Central and Western Kansas was examined for speckled leaf blotch (Septoria tritici) and orange leaf rust (Puccinia rubigo-vera var. tritici). Both of these diseases were found widespread in Kansas, speckled leaf blotch being found in every field examined and orange leaf rust in every county visited and in nearly every field. The areas covered in the week's survey included much of Central and Southwestern Kansas but none of the 9 northwestern counties. Orange leaf rust was found very plentiful at Hays, in Ellis County, particularly at the Hays Agricultural Experiment Station.

Wheat at Hays is exceptionally advanced for this time of year, according to A. F. Swanson of the Hays Experiment Station. Examination of variety test plots indicated considerable variation in resistance to both Septoria leaf blotch and orange leaf rust among the varieties and strains grown. Four of the 24 varieties under test showed considerable resistance to orange leaf rust, at least at this stage of growth. At the same time only 2 of the varieties showed resistance to the Septoria leaf blotch. -- C. M. Slagg.

WINTER WHEAT IN SOUTHWESTERN INDIANA: Winter wheat growing in Southwestern Indiana (Indiana Crop Reporting Disctrict 7), was inspected for disease during the week ending March 24. A survey so early in the season was prompted by the fact that the present season is advanced and mosaic

was showing in experimental plots at Lafayette.

The counties covered included Sullivan, Knox, Daviess, Dubois, Pike, Gibson, Posey, Vanderburgh, Warrick, and Spencer. Between 15 and 20% of all wheat in the State is grown in this area. At present, the varieties (or selections) planted in this section are largely Fultz, Rudy, and Goens, which are reportedly resistant to mosaic.

Over 100 fields averaging in size from several acres to 100 acres were surveyed, leaves of plants in every fifth field being carefully examined. No wheat mosaic (virus) was observed. Leaf rust and powdery mildew had not yet made an appearance. Septoria tritici, causing speckled leaf blotch, was observed only as a trace on old leaves, probably a result of infection in late 1944.

Plants were from 3 to 6 inches high in most fields. Most of this growth has been rapid, being made only in the past several weeks since the weather suddenly turned warm. It would appear that apparently few growers have planted mosaic-susceptible varieties of wheat in this district or conditions have not been favorable for the full expression of this virus disease. Fields in low areas, especially near streams, were still flooded due to the recent heavy rains and losses will probably occur. -- J.S. Tidd

MOLDING OF HARVESTED GRAIN SORGHUM IN KANSAS: Practically all grain sorghum, including milo, has now been harvested, but it is not all threshed. Considerable grain sorghum remains in the shock, and a number of milo fields have been headed but not yet threshed. In addition to these, much threshed grain of milo and kafir is lying in large piles on the ground. There has been spoilage in many of these piles due to mold development, and increased losses may be expected as warm weather approaches. A number of these piles in Stevens, Morton, Stanton, and Grant Counties were examined and the least damage estimated in any pile was 5%. Where loss was low, spoilage had occurred only in the 2-inch layer in contact with the ground. Where losses were high, the mold seemed to have advanced upward in the center of the pile. From conversations with county agents, elevator operators, and farmers, it seems probable that an estimate of 10% loss due to spoilage in piles is reasonable, and this loss may be considerably increased if the piles are not moved or aerated soon. The exact proportion of the crop left in piles on the ground is hard to estimate, but probably does not exceed 20% of the total crop. County Agent A. P. Timmons estimated 500,000 bushels of milo still in piles on the ground in Stevens County on March 25, as compared with the total estimated production of 3,000,000 bushels for this county.

The reason for milo and other grain sorghums still being in piles on the ground and some not yet threshed has been the lack of railway cars to haul it to market. Whenever farmers were notified of a car being available at a certain siding or elevator, they would each market a load of milo or thresh a load of grain sorghum and hurry it to town as rapidly as possible, repeating this procedure as soon as another car became available. -- C. M. Slagg, Mar. 19-24.

TEXAS FLAX: During the week of February 26 flax was examined in the Coastal Bend and Lower Valley with Mr. E. S. McFadden, Associate Agronomist, U. S. Department of Agriculture. Good stands were obtained, and some fields were in flower, while others were maturing bolls. Rust-resistant

varieties are planted, including Rio, Norsk, Golden Viking, Canadian Royal, Victory, and Walsh. Rio and Norsk are the most common varieties. Canadian Royal and Walsh were introduced in the Corpus Christi area this year owing to lack of seed of other varieties at planting time. Only one field of Punjab was seen. Diseases observed included the following:

Post-emergence damping-off (Rhizoctonia sp.) was prevalent and practically destroyed the value of a variety test at Beeville. Only occasional plants were damped-off in commercial fields.

Strangulation (mechanical) occurred in several areas in Wharton County, owing to hard-packed crusted soil which prevented the normal expansion of the stems at the soil line.

Pasmo (Phlyctaena linicola) [Mycosphaerella linorum] was observed in only one field which was planted very early. Infection appeared too late to cause appreciable damage.

In a number of fields there were limited areas where Alternaria leaf spot was prevalent, but had not become serious.

Dodder (Cuscuta sp.) was parasitizing flax in a small area in Nueces County. -- George E. Altstatt.

DISEASES REPORTED ON LEGUMINOUS FORAGE AND COVER CROPS

Reports are of the Emergency Plant Disease Prevention Project surveys.

ALFALFA DISEASES IN KANSAS: In Southeastern Kansas the Pseudoplea leaf spot (Pseudoplea trifolii) is abundantly present on old alfalfa stands. All stands 3 years old or more also show considerable losses from bacterial wilt (Corynebacterium insidiosum). First year stands in all parts of Eastern Kansas also show some attack by downy mildew (Peronospora trifoliorum) but sporulation of the fungus was seen only in the southeastern counties. -- C. M. Slagg, Mar. 26-31.

PSEUDOPLEA LEAF SPOT OF CLOVER IN NEBRASKA: A leaf spot of clover collected in Otoe and Nemaha Counties in Southeastern Nebraska during November has been identified by D. A. Preston as caused by Pseudoplea trifolii. Damage due to this leaf spot was not extensive. -- C. M. Slagg, Nov. 13-25, 1944.

VETCH DISEASES IN THE TENNESSEE VALLEY AND THE SAND MOUNTAIN SECTIONS OF ALABAMA 1945: A survey of vetch diseases in the Tennessee Valley and Sand Mountain sections of Alabama was made during the week of March 5. Vetch is the predominating winter cover crop in these sections of the State. Black stem was prevalent in all fields examined. Infections were limited primarily to the base of the plants. In a few fields the disease has progressed from 1/2 to 2/3 the length of the stems with many stems dead.

"Black stem" of vetch may be caused by Colletotrichum spp., Ascochyta spp., and Kabatiella nigricans. The symptoms (in the absence of fruiting bodies) are practically the same for the 3 organisms. Specimens were collected from representative fields for laboratory identification. After the specimens were examined by the writer, they were sent to Dr. J. L. Weimer for confirmation. It was found that a Colletotrichum sp. (anthracnose) was the cause of the greater part of the disease. Scattered infec-

tions of Ascochyta pisi were found. Downy Mildew (Peronospora viciae) was also found in most fields, but was causing little damage. -- G. M.Stone.

SWEETPOTATO STORAGE DISEASES

Reports are of the Emergency Plant Disease Prevention Project surveys.

SWEETPOTATO STORAGE DISEASES IN VIRGINIA: Storages in the truck growing area near Norfolk and on the Eastern Shore were surveyed during the week of February 12 to 17. Both farm and commercial storages were included. Some of the latter in Accomac and Northampton Counties were devoted almost exclusively to sweetpotatoes for seed; they were stored in barrels or bins and were the poorest lots examined. Sweetpotatoes used for seed in this area are "strings" which are too small to make No. 1 grade. They are worthless except for seed, which may be the reason they are neglected. In many of these storages mice were rampant and contributed greatly to rot.

There was little evidence of loss from low temperatures in any storage. Most of the houses had elaborate (compared with the houses in the Carolinas) heating systems, often with thermostat control. The greatest loss in these houses was from shrinkage due to drying out, which by affecting bushel weight can be a large item in repacking or sorting operations. In one house troughs were placed with gunny sacks hanging into the water from a wire above, thus acting like wicks. This storage manager had wet and dry bulb thermometers and computing tables on all floors of his storage. In this house the humidity was at the correct level.

Black Rot, Ceratostomella [Endoconidiophora] fimbriata, was the most important disease encountered. When it was present in a storage the cull pile was always large. In several storages this disease was found associated with a brown necrosis with a tendency toward separation of tissues producing chambers or radial cavities. It was not typical black rot and the writer suspected it might be the storage rot phase of foot rot, Plenodomus destruens. Dr. W. W. Ray, however, isolated the black rot organism and a species of Fusarium, an association that he has recently observed rather commonly while working with a large collection of sweetpotatoes.

Soft rot, due to Rhizopus and Mucor spp. was especially severe when storage conditions deviated from the ideal. Where low temperatures occurred, where mice were present, and in bin and barrel storage where air circulation was impaired, "nests" of soft rot were found. Growers are very reluctant to allow inspection as they say a handled sweetpotato will invariably rot. Thus any agency that breaks the skin at this time of the year will allow the root to go down with soft rot.

Mottle Necrosis, Pythium ultimum, which was identified by symptoms alone, was seen in several lots in Princess Anne County.

Scurf, Monilochaetes infuscans, was abundant in almost every seed lot examined in one storage on the Eastern shore.

Surface rot, Fusarium oxysporum. It was interesting to notice the varying amounts of surface rots in different lots. No doubt the labor situation this year is accountable for the rough handling and bruising which are conducive to surface rot. Some lots ran as high as 10% of the roots affected.

Other Diseases. Traces of Java Black Rot, Diplodia tubericola, Dry Rot, Diaporthe batatis and Soil rot or Pox, Actinomyces ipomoeae, were seen occasionally. -- R. E. Atkinson

STORAGE DISEASES IN CERTIFIED SWEETPOTATOES IN NORTH CAROLINA: The period between February 15 to 23 was spent inspecting certified sweetpotatoes with Dr. L. S. Bennett and Mr. A. D. Stuart of the North Carolina Crop Improvement Association.

The crops of 27 growers totaling 4022 bushels were inspected; the information obtained being presented in Table 1 below.

Table 1. Showing Diseases Found, the Number of Growers visited and the Number of Bushels Inspected in each County.

County	Number bushels	Number growers	Diseases
Bertie	805	6	Surface rot, soft rot, Java black rot, cold injury.
Balden	25	1	Soft rot and cold injury.
Carteret	350	2	Surface rot and soft rot.
Columbu	785	3	Soft rot and cold injury.
Craven	300	1	Surface rot and soft rot.
Jones	171	2	Black rot[a], Scurf[a], soft rot.
Onslow	1098	3	Surface rot, soft rot, cold injury.
Pender	100	1	None observed.
Sampson	378	8	Black rot[b], scurf[a], surface rot, Java black rot, soft rot and cold injury.
Total	4022	27	

[a] In 1 lot. [b] In 3 lots.

North Carolina certification regulations give no tolerance to both black rot and scurf, therefore, lots with these 2 diseases were rejected. In Sampson County the sweetpotatoes of 3 growers totaling 141 bushels were a total loss because of disease conditions. Another grower with 100 bushels had serious cold injury and will probably lose most of these.

Surface rot was found in 10 of the lots, and soft rot in 24 of the 27. These 2 diseases probably cause the most damage and loss to the growers.

Of the 27 growers 4 had no evident diseases. In these cases considerable care had been taken in handling and curing and the storage places had been carefully watched to keep proper temperature--humidity relations during the winter.

Two growers had what appeared to be serious trouble with a Penicillium dry rot. Isolations were made from the invasion zone in several potatoes and only a Fusarium was obtained. Dr. R. F. Poole was consulted concerning this and he informed me that the surface rot organism was the primary invader and other organisms followed and that the whole situation was probably correlated with improper handling and storage conditions.

Since the sweetpotatoes were still in storage houses or banks it was not possible to see enough to make accurate estimates as to loss and damage. -- Alton E. Prince.

PRELIMINARY NOTE ON THE USE OF DITHIOCARBAMATES AS SOIL TREATMENTS FOR THE CONTROL OF SOIL-BORNE DISEASES

J. W. Heuberger

Three exploratory experiments, one in the field and two in the greenhouse, have been made on the use of various derivatives of dithiocarbamic acid as soil treatments for the control of soil-borne diseases. The data obtained show that these materials may have considerable value for the control of such diseases.

Experimentation and Results

Southern Blight of Peppers (Sclerotium rolfsii). During 1943 a field of California Wonder peppers was found in which more than 50% of the plants were killed by southern blight. Arrangements were made with the grower to replant a portion of this field to peppers in 1944. The land was plowed on May 2, 1944. On May 3, Dithane (disodium ethylene bisdithiocarbamate)[1] was spread at the rate of 75 pounds/acre on a plot one-fiftieth acre in size. It was then thoroughly raked into the soil, after which the area was disced and harrowed. California Wonder peppers were planted in the treated and untreated areas on May 27. Records taken during the season show that 7% of the plants in the untreated area were killed by southern blight whereas no plants in the Dithane-treated area were affected.

Damping-Off of Peas (Pythium sp.). A lot of soil in which the damping-off inoculum potential was high was thoroughly mixed by shovelling so as to obtain uniformity. The amount of soil was sufficient for 5 greenhouse flats. The soil in one flat was not treated. Chemicals were mixed with the soil in the other 4 flats in the following manner: The soil from each flat was spread out thinly on a bench and then the chemical, mixed with dry sand, was spread over the soil; the soil and chemical were thoroughly mixed by shovelling; then the treated soil was replaced in the flat. The chemical treatments used were: Dithane, 200 pounds/acre; Dithane plus zinc sulfate-lime (2-1-1/2), 350 pounds/acre; zinc dimethyl dithiocarbamate[2], 200 pounds/acre; and calcium dimethyl dithiocarbamate[2], 200 pounds/acre. All 5 flats were then placed in a cool greenhouse and kept moist for 15 days. On February 6, 1945, half of each flat was planted with 80 untreated Pride pea seeds and half planted with 80 Spergon-treated Pride pea seeds. Planting depth was 1 inch. Stand data were taken on 3 dates (Table 1).

The data in Table 1 show that soil treatment with Dithane and calcium dimethyl dithiocarbamate gave about twice the control of damping-off as did Spergon seed treatment; planting Spergon-treated peas in soil treated with Dithane and calcium dimethyl dithiocarbamate only slightly increased final stand over that of soil treatment alone. No deleterious effect on the growth of peas has been observed to date (March 23).

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[1] Supplied by Rohm and Haas Company, Philadelphia, Pennsylvania. A dry powder containing 85% disodium ethylene bisdithiocarbamate hexahydrate.

[2] Supplied by E. I. du Pont de Nemours & Company, Wilmington, Delaware. Dry powders containing 80% active ingredient.

Table 1. Effect of soil treatment with dithiocarbamates on the control of damping-off of peas in the greenhouse, Newark, Delaware, January 22 - February 23; 1945. (Pride variety).

Soil Treatment	Seed Treatment	Stand (percent) on [a] Feb. 16	Feb. 17	Feb. 23
None	None	6	6	6
	Spergon	31	33	33
Dithane (200 pounds/acre)	None	48	56	59
	Spergon	46	74	78
Dithane + zinc sulfate-lime (350 pounds/acre)	None	13	40	61
	Spergon	8	43	70
Zinc dimethyl dithiocarbamate (200 pounds/acre)	None	9	18	19
	Spergon	18	35	41
Calcium dimethyl dithiocarbamate (200 pounds/acre)	None	54	54	64
	Spergon	63	74	76

[a] Percentage germination of the seed lot used was 82% as determined by the moist chamber method.

A second greenhouse test was made to obtain information on 2 points, namely: (1) Can soil treated with dithiocarbamates be used for immediate planting, and (2) can dithiocarbamates be mixed with fertilizer and still be effective when the mixture is incorporated in the soil? Dithane was the only dithiocarbamate used in this test as the amount of soil with a high damping-off inoculum potential was limited. Five flats of a uniformly mixed lot of soil were used. One flat received no soil treatment; 2 flats were treated as described above, with Dithane at the rate of 75 pounds/acre; and 2 flats were treated with Dithane (75 pounds/acre) premixed with a 5-10-5 victory formula fertilizer (800 pounds/acre). The untreated flat, one of the Dithane-treated flats, and one of the Dithane-plus-fertilizer-treated flats were planted with peas immediately after the soil treatments were made on February 28, 1945; half of each flat was planted with 80 untreated Pride pea seeds and half with 80 Spergon-treated Pride pea seeds. After planting, the flats were watered heavily. The 2 remaining flats, one treated with Dithane and the other with Dithane plus fertilizer, were watered heavily and held for a week before being planted with Pride peas as described above. Final data are presented in Table 2.

The data in Table 2 show the following: (1) that soil treatment with Dithane alone or mixed with fertilizer gave better control of damping-off than did Spergon seed treatment used alone; (2) that Dithane apparently is compatible with fertilizer and can be mixed with it without impairing the effectiveness of the Dithane or causing injury to pea seed; and (3) that soil treated with Dithane alone or incorporated with fertilizer can be planted with peas immediately after the soil is treated.

Table 2. Effect of immediate planting of peas, Pride variety, in soil treated with Dithane alone and with Dithane plus 5-10-5 fertilizer.

Soil Treatment	Seed Treatment	Final Stand (Percent)[a]	
		Planted immediately after soil treatment	Planted one week after soil treatment
None	None	5	--
	Spergon	20	--
Dithane (75 pounds/acre)	None	61	28
	Spergon	68	70
Dithane + 5-10-5 fertilizer (75 + 800 lbs./acre)	None	64	58
	Spergon	64	65

[a] Percentage of germination of the seed lot used was 70% as determined by the moist chamber method.

General Interpretation of Data

As disodium ethylene bisdithiocarbamate (Dithane) and calcium dimethyl dithiocarbamate are water-soluble, and zinc dimethyl dithiocarbamate is relatively insoluble, the data are interpreted to mean that the soluble dithiocarbamates may be more effective as soil treatments than the relatively insoluble dithiocarbamates.

The excellent control of damping-off of peas by soluble dithiocarbamates used as soil treatments (2 to 3 times better control than that obtained by the use of Spergon seed treatment) indicates that these materials had reduced the inoculum potential of the soil to such a low level that damping-off was not a factor. Future research will determine the mode of action of soluble dithiocarbamates as soil fungicides.

The excellent control of damping-off of peas by soluble dithiocarbamates used as soil treatments indicates the possibility that these materials may be effective for the control of root-rot of peas in the field. Field tests are now in progress on this point. Further, the control of damping-off of peas, coupled with the fact that Dithane soil treatment gave indications of controlling southern blight of peppers, indicates that soluble dithiocarbamates may be effective for the control of a wide range of soil-borne diseases.

DEPARTMENT OF PLANT PATHOLOGY, DELAWARE AGRICULTURAL EXPERIMENT STATION

DEVELOPMENT OF APPLE SCAB

APPLE SCAB AND CEDAR RUST IN NEW YORK (Reports from New York State College of Agriculture, Departments of Entomology and Plant Pathology, Weekly Letter on Insect Pests and Plant Diseases for the dates given):

Hudson Valley -- (Mar. 22). A McIntosh leaf sample gathered in Northern Orange County March 20 showed about 15% of the ascospores colored in

perithecia of the scab fungus, Venturia inaequalis. McIntosh fruit buds in early orchards were in the green tip stage. A McIntosh sample from the southern end of the county, March 21, showed about the same scab development. Cedar apples of the apple rust fungus, Gymnosporangium juniperi-virginianae, had telial horns 1/8 inch long on March 21 in southern Orange County. -- G. G. Maier.

(Mar. 26). McIntosh leaves collected at Poughkeepsie March 22 contained a few perithecia with some colored spores but none were mature enough to be discharged. -- D. H. Palmiter.

Western New York -- (Mar. 22). McIntosh leaves gathered at Ithaca in the afternoon of March 21 showed colored ascospores in about half the perithecia in some leaves but the perithecia were immature or bore only well-developed asci in a number of the leaves. A trace-shoot of ascospores occurred in 3 hours. The orchard had been burned over, making good sample taking impossible. At this time McIntosh buds were showing some green on the most advanced buds.

(Mar. 26). Perithecia in a McIntosh leaf sample gathered March 25 showed an unusually high percentage of perithecia containing colored spores for this time of year. More than half the ascospores were colored in 28% of the perithecia while less than half were colored in 32%. Only 6% of the perithecia showed well-developed asci but no spores, and 34% were quite immature. A trace discharge of ascospores occurred on trap slides, about the same number as were shot in the sample of March 21. As with the earlier sample, the rate of discharge was still extremely light after 22 to 24 hours in the moist chamber. McIntosh buds in 2 orchards near Ithaca examined March 26 were still in the silver tip stage. -- W.D. Mills and J. E. Dewey.

(Mar. 26). In Wayne County McIntosh in early sections are in silver tip stage with a little green showing on occasional buds. Slight apple scab spore discharge was obtained from samples collected in the Lake Zone on March 23. -- C. G. Small.

APPLE SCAB IN WISCONSIN: Owing to the early season warm weather conditions, Venturia inaequalis spores were being discharged and buds were in silver tip stage following a light rain on March 25. -- R. E. Vaughan, University of Wisconsin Agricultural Extension Service. Mar. 27.

OTHER REPORTS ON DISEASES OF FRUIT CROPS

Reports are of the Emergency Plant Disease Prevention Project surveys.

EARLY LEAF SPOT ON SAND PEAR IN MISSISSIPPI AND LOUISIANA: In Southwestern Mississippi leaves of sand pear have been out in full now for about 2 weeks, and spots caused by Fabraea maculata are already in evidence.

The disease is showing up on leaves, out for about 2 weeks, in orchards near Covington, St. Tammany Parish, in southern Louisiana. -- Douglas C. Bain, Feb. 19-Mar. 2.

STRAWBERRY DISEASES IN LOUISIANA: The berry crop in the Hammond area of southeastern Louisiana is coming in 2 to 3 weeks earlier than usual. Thus far the weather has been dry enough to prevent extensive development

of berry-rotting fungi. Barely a trace of Botrytis rot was found in the several fields surveyed. In one large field of about 15 acres, an estimated 1 to 2% of the ripe berries were affected by tan rot (Pezizella lythri). Leaf spot (Mycosphaerella fragariae) was found only in trace amounts on susceptible varieties. The growers follow a rather rigid spray schedule. In fields where drainage is poor as high as 4% of the plants had been killed or were dying because of attack by Sclerotinia sclerotiorum. Last year this disease occurred only in trace amounts. -- Douglas C. Bain, Mar. 5-16.

DISEASES OF CANE FRUITS IN CENTRAL CALIFORNIA: Plantings were observed in Sonoma County on March 7, with Dr. H. Earl Thomas of the University of California.

About 80% of the plants in one 2 1/2-acre field of Young berries were systemically infected with orange rust (Gymnoconia peckiana), and the patch was being taken out. Adjacent Boysen berries were not infected. One Logan berry plant in a planting in another vicinity was infected.

Leaf and cane spot (Mycosphaerella rubi) was general in light amounts on all of the bush berries. -- Henry Schneider.

BRIEF NOTES ON PLANT DISEASES

Reports are of Emergency Plant Disease Prevention Project surveys.

VEGETABLE DISEASES OBSERVED IN SOUTHERN CALIFORNIA: During the week ending March 17 surveys were conducted in Los Angeles and San Diego Counties.

Celery: Many celery fields in the vicinity of Venice were inspected. Late blight (Septoria apii) was found in amounts ranging from a trace to 10% in most of the fields inspected. Western celery mosaic (virus) was found in a few scattered plants.

In celery fields visited in the vicinity of Oceanside late blight and early blight (Cercospora apii) were found. Neither disease was causing any loss.

Crucifers: Mosaic (virus) and downy mildew (Peronospora parasitica) were found in small amounts in all cauliflower fields visited in Los Angeles and San Diego Counties. Ringspot (Mycosphaerella brassicicola) and gray leaf spot (Alternaria brassicae) were found in trace amounts in one field of broccoli near San Juan Capistrano. Cabbage plantings inspected in both counties were found to be free of diseases.

Pea: In a small planting of peas near San Juan Capistrano, 100% of the plants were infected with scab (Cladosporium pisicola). In the same field plants affected with mosaic (Pea virus 1) were commonly encountered.

Potato: Potato seed plots at Oceanside were inspected for diseases. Mosaic (mild, crinkle, and rugose) was the most common disease encountered. Leaf roll (virus) was quite prevalent in occurrence. Haywire (virus) and witches' broom (virus) were found in a few scattering plants.

Trace amounts of black leg (Erwinia phytophthora) and Rhizoctonia solani) were found. -- E. W. Bodine.

TOBACCO DISEASES IN SOUTHERN LOUISIANA: The tobacco area at Grande Pointe (St. Johns Parish) was revisited (see PDR 29 (7): 201). Plants

were still in seed beds. No downy mildew was found. In some coldframes, Cercospora leaf spot occurred in trace amounts.

From cultured roots and crowns of plants affected by the damping-off reported earlier a species of Fusarium has been isolated consistently, while Rhizoctonia tentatively identified as R. solani has been obtained from the spotted or blighted seedling leaves described in the earlier report. -- Douglas C. Bain, Mar. 5-16.

SOME REPORTS ON DISEASES OF ORNAMENTALS AND MISCELLANEOUS PLANTS: (From reports of Emergency Plant Disease Prevention Project surveys).

Blight of Calendula and Snapdragon in Delaware and Maryland. Several greenhouses in Delaware and Maryland were visited during February. All of these were growing ornamentals, none having converted to vegetables. The only disease of any interest was a blight, apparently due to Botrytis sp., of calendula and snapdragon. The fungus seemed to have entered the stems of affected plants where they were cut during flower removal, and under conditions of high humidity a large part or all of the remaining shoot-system blighted. -- A. J. Mix

Gardenia canker in California. A grower at Redwood City was losing from 10 to 30% of the plants in some of his greenhouses from canker (Phomopsis gardeniae). -- Henry Schneider, Feb. 5-10.

Spotted Wilt in Nasturtium in California. A field of seed nasturtiums observed in the Salinas Valley during the early part of October 1944 contained nearly 100% spotted wilt (virus). -- Henry Schneider.

Sweet Pea Mosaic in California. Pea mosaic (pea virus 1) was commonly found in all plantings, grown for seed production, inspected in the Lompoc district in Santa Barbara County during the early part of March. -- E. W. Bodine

Leaf Spot of Madrone in California. The foliage on hillside trees in Sonoma County was severely affected by leaf spot (Mycosphaerella arbuticola) over a wide area, and many trees had lost most of their leaves. -- Henry Schneider, Mar. 5-10.